

# Transportation Research Information Services (TRIS): Meeting the Unique Needs of Transportation Professionals?

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## Abstract

Free, public access to TRIS Online is hosted by the National Transportation Library, although it has existed since the early 1970's. The paper offers a user-focused methodology to answer the research question "Is TRIS meeting the unique needs of transportation professionals?" The paper outlines the information seeking behavior of an occupation-specific user group where little research exists. As Baldwin notes (2003), "Although there is a general assumption that a large portion of transportation-related materials are available on the Internet, few, if any, studies have been done on the topic. For most of the transportation community TRIS Online is seen as the most important single means of identifying transportation-related information resources". Jacsó (2006) describes TRIS as an exhaustive open access resource available for users. TRIS is an issue-specific resource that has evolved to meet changing needs.

In a mixed-methods pilot study, researchers gathered data from volunteers at the start of their career (graduate students) and those established in the field (professionals). It is critical to emphasize that the research represents an exploratory pilot study. The study provides a foundation and tested instruments for a larger-scale study similar in nature.

## Executive Summary

### Introduction

The project utilized a mixed-methods pilot study approach to answer the primary research question: "How is TRIS serving the unique needs of transportation professionals?" with an emphasis on differences that may arise between those at the start of their career and those more established in the field. A literature review provides background for the pilot study.

### Pilot Study

The pilot study was comprised of two main parts:

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1. Volunteers from both a graduate school and the professional setting were asked to research a topic of their choice using the TRIS system for 10 minutes. The researchers observed and noted specific elements of the interaction between user and online database.
2. After the observation, the researchers interviewed the volunteers and noted their responses. The interview portion had no time limit.

### *Results*

The pilot study observations yielded quantitative results including:

- total searches,
- access points used within searches: keyword or author search, and
- use of basic and advanced searches.

The interview portion of the pilot study allowed the researchers to hear informal comments that included praise about TRIS as a resource, ideas to make it more user-friendly, and how to inform students about TRIS. The researchers found—from practical experience conducting the study—that the design is feasible and yields the data necessary for extensive analysis.

## **Literature Review**

### *Introduction*

Government resources and accessibility have merged with technological advances. The Transportation Research Information Services (TRIS) database was recently retooled to help transportation professionals, students, and the general population access information related to transportation.

Jankowska (2004) observes that “expanding technologies influenced a shift in library activities,” a change mirrored in the vast reference resources available online through TRIS. This trend toward “expanding technologies” is part of the reasoning behind The Center for Transportation Studies’ (CTS) desire to test the validity of TRIS in terms of meeting the information needs of the transportation community.

The researchers attempted to answer how TRIS is serving its primary audience of transportation professionals, with an examination of generational differences. The focus of this literature review is to examine on a national level the interconnection among the themes of engineers/transportation professionals, the use of TRIS as an electronic resource, and the information seeking behaviors of those established in their careers and those new to the field.

The focus of this project was propelled by a real-life need of CTS information professionals to better understand how their constituents are utilizing TRIS. One researcher served as a CTS library intern at the time of this project. The CTS, at the University of Minnesota, is a national transportation resource bringing together faculty with state and federal departments of transportation, as well as solidifying the University’s place in transportation-related research and education (Center for Transportation Studies, 2007). The other researcher’s background is in public affairs and communications with some work in transportation advocacy with local, state, and federal governments.

The research inquiry is essential as noted by Baldwin (2003), “Although there is a general assumption that a large portion of transportation-related materials are available on the Internet, few, if any, studies have been done on the topic. For most of the transportation

community TRIS Online is seen as the most important single means of identifying transportation-related information resources”.

The Bureau of Transportation Statistics had planned significant cutbacks to the National Transportation Library (NTL), which hosts TRIS Online (Sarmiento, 2003). Luckily, the transportation community rallied to make policymakers more aware of NTL’s value, and most cuts were averted. A few years later, the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), a federal act to help streamline the cumbersome planning process for transportation professionals, was passed into law (Hall, 2006).

Not only did the United States government stress the importance of information coordination in the transportation profession, but the disconnection among information resources has proven problematic. The amount of materials developed for one project alone can be immense as evidenced by Lang’s (1987) example of Britain’s M25 120 mile highway. Lang outlines the transportation documentation generated during the time it was being planned and parts were built. Furthermore, Lang notes that the transportation professionals involved in this 14-year long project included 15 contractors, hundreds of subcontractors, 12 leading consulting engineers, and three road construction units as (p. 57, 64).

The importance of TRIS is illustrated by government interest and the sheer volume of documents. Additionally, Sarmiento (2003), Head of Northwestern University’s Transportation Library, echoed Baldwin by calling the NTL and TRIS Online “the ‘central square’ of our community” (p. 23).

#### *From the Front Lines: Information Needs of Transportation Professionals*

The passion of transportation professionals helped save TRIS from cutbacks, and it is clear why they value the resource. Consider the information that just one, albeit large, transportation project (M25) can generate. White papers, policy statements, press releases, public consultation exercises, over thirty public inquiries, six High Court actions, technical drawings, contractors’ brochures, technical journal articles, design manuals, and closed circuit television feeds for traffic control centers all came out of the M25 in the form of reports, legal proceedings, conference papers, audio/visual materials, media coverage and more (Lang, 1987, p. 58-60). Complicating this crowded information landscape is the fact that grey literature comprises a significant portion of the resources transportation researchers need (Osif, 2000).

While Lang’s look at the M25 is 20 years old, the case is highlighted to illustrate the range of information that transportation professionals both generate and seek. “[T]he main problems as I see them are not the dearth of information but rather the wealth of it, its dispersed location and the difficulties which have to be faced in trying to get access to it,” Lang remarks (1987, p. 57). While the problem of “dispersed locations” may be somewhat ameliorated today by the World Wide Web, 21<sup>st</sup> century transportation professionals still face challenges of the broad, interdisciplinary nature of transportation information. Yet this array of information holds much value for transportation professionals. As a county engineer commented, “information is an opportunity” to meet challenges transportation engineers face (Mathison, 2002, p. 40).

According to Baldwin (2003), transportation professionals are “enamored” with digital solutions to their information needs, both in the form of virtual libraries and Internet search

engines. He observes that transportation professionals are apt to utilize technology, and full-text electronic access to transportation reports is one of the most sought after resources by this group. A county engineer includes the Internet as a primary source of information for the transportation community, equal to State Department of Transportation (DOT) libraries, Local Technical Assistance Program (LTAP), former professors, and TRIS Online (Mathison, 2002).

At the Midwest Conference on Library and Information Services for Transportation, a theme arose that “Practitioners and managers have very little time available to keep up with new developments in the field, yet the need for both technical and planning/strategic information is high” (Mathison, 2002, p. 40). Brad Mallory, PennDOT Secretary and American Association of State Highway and Transportation Officials (AASHTO) President at the time, outlined another problem: rigidity, and the importance of quality information to breaking through this barrier.

Additional information needs of transportation professionals were expressed at this gathering. Current awareness services, desktop delivery of pertinent materials, bridging the gap between research and practice, and synthesis of research results were identified as solutions to meet the transportation community’s need for quick, easy access to information (Mathison, 2002).

#### *Studies and Research: Information Behavior of Professionals*

While formal research is scarce in this area, some studies do provide insight into the unique information behaviors and work cultures of transportation professionals, and insights can be drawn from research in other professions.

Rose (2006) looked at the information activity of Australian Passenger Information Officers (PIOs) within an urban central control room for rail passenger operations. The PIO’s are described as non-linear foragers in constant pursuit of critical information. Human sources of information were shown to be most heavily utilized in this dynamic work environment, as there is often no recorded information to solve real-time rail problems. This mirrors other studies showing that engineers—a discipline well-represented in transportation—are more likely to talk to colleagues, try to solve problems themselves, use past experience, or rely on trial and error (Pinelli, 1991). This raises interesting questions about the effectiveness of a database-driven resource like TRIS for the real-life needs of this community. Even among transportation researchers, database usage has been shown to be low, according to a 1994 Bravo et. al. study quoted by Osif (2000).

The outcomes of the Australian PIO study also underscore the impact of work environment, as “Dynamic situations have a significant impact on information behaviour which is not always predicted by current theories of information science” (Rose, 2006). The information needs and behaviors of such front-line professionals will differ significantly from those engaged in non-dynamic environments, such as urban planners. This study helps to illustrate some key differences within the transportation community central to the selection of participants for this project’s pilot study.

It is worthwhile to note other factors that may influence the information seeking behaviors of engineers, as they are so prevalent in transportation. Henderson (1995) outlines the “Constant exposure and interaction with a ‘way of seeing’ develops skills in visual reading analogous to verbal reading and writing literacy” (p. 221). She observes that drawings are the focal point for how engineers solve problems, learn about situations and communicate with each other.

However, Henderson does not report any formal data-gathering methods, and it remains unclear if her conclusions are the result of a formal study or anecdotal evidence. Furthermore, it has been shown that engineers are happiest with a precise answer to an information need, rather than a list of resources, and time efficiency may be more important than quality of information. When they do read, engineers tend to consult technical materials like handbooks and standards (Pinelli, 1991). Pinelli quotes a 1977 study by Allen showing that engineers “seldom use information services which are directly oriented to them.” Has this changed over the past 30 years, especially with desktop access to online resources like TRIS?

Although concentrating in the medical field, studies by Adams, Blandford, and Attfield (2005) draw results that are applicable to transportation. While digital libraries are viewed as a valued resource, they state that “a constant review of these libraries and their structure and content is required.” (p. 117).

Robinson et. al. (2005) provides design information about one of the electronic resources discussed by Adams, Blandford, and Attfield, the United Kingdom’s National Electronic Library for Health (NeLH) by stating that the “access and content of the library is being developed for four main user groups: patients and caretakers, mental health professionals, primary care professionals, and health policy professionals. While the resources that comprise the database will remain constant, the output of a query will vary depending on the type of user so that it may be tailored to their need.” (p. 44).

#### *TRIS and Methodologies for Studying Electronic Resources*

TRIS is a database produced by the Transportation Research Board, a body of the U.S. federal government. TRIS Online has been hosted by the National Transportation Library since 1999, although the database has existed in various forms (mediated resource through Dialog; CD-ROM) since the early 1970’s. Today’s free, public access to TRIS Online makes it more accessible to more people than ever before (National Transportation Library, 2007).

In his review of TRIS, Wang (2001), a Portland State University librarian, describes TRIS’ user base as a diverse cross-section of the transportation community, including researchers, engineers, planners, economists, environmentalists, designers, consultants, lawyers, teachers, students and others interested in transportation. The breadth of topics covered is equally great; Wang (2001) notes that “A detailed search finds that subjects covered in the database are diverse and in-depth, reflecting the interdisciplinary nature of transportation-related research. Subjects include, for example, accidents and injuries, automotive industry, biomechanics, driver behavior, human factors, law and policy analysis, planning, roads and traffic, safety, shipbuilding, transportation systems, and vehicle dynamics” (Critical Evaluation section, para. 1). While noting several areas for improvement, Wang concludes that TRIS provides value to users as a crucial transportation resource.

More recently, Jacsó (2006) describes the TRIS database as an exhaustive open access resource available for users. He states that although it lacks some “power search capabilities of Dialog or Ovid,” it includes close to 10,000 full-text (HTML or PDF) documents. Further, Jacsó cites that by his calculations, eight out of 41 recently published documents had full-text available.

Few formal studies have dealt specifically with TRIS; those that do have tended to be system-oriented rather than user-focused. Baldwin (2003) demonstrates that 82 percent of sampled documents from TRIS Online could be easily accessed via other Internet sources or through

library networks. Another study looked at TRIS when it was released on CD-ROM, the first time TRIS was directly available to users. Records were coded and analyzed in various ways, including the availability of resources (Osif, 2000). Both studies were highly quantitative in nature, involving various forms of researcher-submitted queries and analysis of results. While providing insights into the nature of the database and its records, neither study looked at the complex interactions between users and TRIS as an electronic resource.

A 2000 study provides a good example of using user-defined searches to study how users interact with electronic databases. Efthimiadis (2000) asserts that “most IR [information retrieval] research, with relevance feedback systems or the web, is still excluding the user. There is, therefore, an apparent need for carrying out real, rather than simulated, interactive searching...” A combination of questionnaires, search logs and user-evaluated search results were used for analysis (p. 989-90).

This study brings to light the need to examine the different implications of a study based on ‘authentic’ user-generated queries versus those supplied by researchers. A simulated model brings the benefits of uniformity which can aid in drawing broad-based conclusions about how participants search. On the other hand, user-generated queries provide unique, valuable insights into what participants want to search.

In a 1997 study, Macpherson (2004) looked at undergraduate students’ electronic database information retrieval. While the study’s focus on information literacy teaching methods is of little use here, its methodology is: A pre-test survey, post-test survey and information retrieval assignment were used to gather data. The first survey gathered baseline information, such as demographics, computer anxiety and electronic database knowledge. The post-test survey measured electronic database knowledge, which was compared to the pretest information. The assignment was considered another type of post-test, administered after instruction. In the assignment, students found article citations that were highly related to three search topics. Each search topic had an increasing level of difficulty (p. 342-5).

This type of design seems most appropriate for answering questions around search efficacy, and elements could be applied to generational differences in searching TRIS. The most applicable piece would be the information retrieval assignment, which could demonstrate differences and/or similarities in search effectiveness based on various levels of professional experience.

While not specific to electronic resources, a study of higher education students used various methodologies including surveys and in-person interviews using “critical incident technique” where students were asked to recount a recent, important information seeking activity (Armstrong et. al., 2001, p. 241). Researchers qualitatively analyzed both survey and interview results using taxonomy they developed to categorize participant responses. This highly qualitative method provides rich, although individualized, insights into information seeking behaviors.

Another qualitative method, paired with quantitative analysis, is found in Rose’s (2006) aforementioned study of Australian PIO’s. Methodologies included eight-hour observation of two PIO’s, semi-structured interviews, data analysis and scenario analysis. This mix of qualitative and quantitative methods provides a robust view of the information activities of the transportation professionals. At the same time, the study’s greatest weakness is that data was collected from only two subjects, making any generalizations impossible.

*Differences Based on Generation and Professional Life Cycle*

Research shows that there are significant differences among people of different ages and, for our purposes, professions. Professionals bring skill sets that are inherent, developed, and generational; professionals who are now at the start of their career are more technology-immersed than previous generations.

Strouse (2004) cites that “when asked to assess their own online searching skills, 92 percent of knowledge workers aged 18 to 24 rate themselves as “skilled” or “adept,” while only 77 percent in the 55-and-over age group do.” Jankowska (2004) observed that it was difficult for educated professionals to recognize the difference between “Web sites and commercial databases available via the Internet.” Adams, Blandford, and Attfield (2005) shared that, in the medical arena, “[s]enior clinicians noted expressed a concern with the web that less experienced junior staff would not be able to discriminate between reputable and non-reputable information sources.” (p. 29)

Futas and Vidor (1986) conducted a survey of graduate students and graduates in 1984 that provides a premonition for future movements in technology: they state that “there appears to be a need for education about the use of online services as a reference tool.” They hypothesized that the graduates “never stopped working while going to school, and it was more natural for them to transfer applicability and use of online searching to an existing environment while learning the technique.”

Strouse (2004, p. 28) reinforces their foresight by identifying four shifts in content user profiles:

- Users are increasingly independent and focused on content in electronic formats.
- Users prefer searching over “navigating” when seeking information.
- Users have created a social publishing movement that is growing well beyond the bounds of the traditional publishing establishment.
- Users are getting better at making choices among their information options, including efficiency.

Online resources are not new, but the characteristics users are developing help to shape the future and accessibility functions of said resources. Strouse (2004) observes that “Intranets and portals can become more Google-like in focusing on search capabilities and de-emphasizing structured hierarchies to accommodate users’ preferences...”. The single-search box look and feel of TRIS mirrors this recommendation.

Use of electronic information has been shown to vary based on generational differences. A 2005 Pew Internet and American Life Project survey demonstrated that those ages 18-28 embrace interactive software like instant messaging, blogs and online games more than their older counterparts. These members of “Generation Y,” also known as “Millennials,” are more likely to engage in such activities, even compared to those in their 30’s who have comparable access to high-speed Internet at home (p. 2).

However, not all research confirms that information behaviors vary between those at the start of the career training and those who are more advanced. Armstrong et. al. (2001) detail how U.K. first year students, undergraduates and graduate/PhD students utilize electronic information systems. In a study over the 1999-2000 academic year, the researchers expected to find significant differences between students in various stages of higher education,

analogous to our assumption about transportation professionals at different points in their career. The results of the study contradicted initial assumptions, as students' motivation for engaging in a self-identified important information seeking activity did not vary between these groups. Likewise, the types of electronic information resources utilized were surprisingly similar. As Armstrong et. al. (2001) note, "Expectations that new students would move on to use more sophisticated EIS [electronic information systems] in later years was not to be borne out" (p. 252).

On the other hand, Henderson (1995) provides applicable insights into how information processing can vary based on training. Engineers trained in paper drafting conventions rely on a two-dimensional frame of reference that she asserts is ingrained into their overall information processing. She contrasts this with the visual culture of students trained in a computer-graphics system, namely CAD/CAM. These future engineering professionals, used to computer generated three-dimensional representations of their objects, may experience troubles at the two-dimensional drafting board. Conversely, experienced professionals may voice frustrations with computer systems introduced into their work.

Henderson uses an example of how an engineer would draw a cylinder to illustrate this evolution within their visual culture:

To the computer-world drafter...There is nothing in the practice of creating it that suggests it should have a line across the opening. There is only the memorized drafting convention, unrelated to the process of creating the figure [cylinder], to remind the student of the need for the crucial line. The meaning of the line is part of the process, the visual culture, and the visual literacy of the paper-trained designers... Young designers trained on graphics software are developing a new visual culture tied to computer-graphics practice. It will influence the way they see and it will be different from the visual culture of the paper world. (p. 217)

### *Conclusion*

It is clear that TRIS Online is a primary information resource for the transportation community. However, questions remain about its efficacy in serving a target audience group of transportation professionals.

Assessments from the front-lines about the characteristics and information environment of transportation professionals provide critical evidence about why an efficient, user-friendly, and centralized information service is imperative. Formal studies in transportation and other professional sectors, when taken together, point to the need to further evaluate how TRIS fits into the workflow and culture of the transportation community. Several methodologies are available to study user interactions with electronic resources, although none have yet been applied to TRIS Online.

Finally, clear differences based on a user's point in her professional life cycle—whether at the start or more advanced in one's career—have been borne out in many contexts. We expect the same to be true when examining user interactions with TRIS Online. All of this information, when taken together, provides a foundation for answering our central research question: How is TRIS serving the unique needs of transportation professionals?



## Analysis and Conclusions

### *Overview of research conducted*

In this mixed-methods pilot study, the researchers gathered data from four volunteers to help answer the research question “How is TRIS meeting the unique needs of transportation professionals?” with special attention to those at the start of their career and those more established in the field. Two volunteers were graduate students in transportation-related disciplines and two were transportation professionals more established in their professional lives. The graduate students are referred to as Student Number One (S1) and Student Number Two (S2). Similarly, the professionals are Professional Number One (P1) and Professional Number Two (P2).

The researchers soon realized the importance of removing all identifying information from their research report, because it will not only be shared with the instructor but will also be reviewed by personnel at the Center for Transportation Studies (CTS). Given the small size of the local transportation community, first names would likely reveal the volunteers’ identity to CTS staff and others who may be privy to these results. Because of the small-scale nature of the pilot study, an IRB exemption was sought. Should this study be produced on a larger scale, IRB permissions would surely be a necessity. It is critical to emphasize that this research represents an exploratory pilot study. Because only four volunteers were observed and interviewed, the results are neither statistically significant nor generalizable. Rather, the pilot study provides a foundation for a similar, larger-scale study of the same nature.

The researchers:

- Observed trends from the resulting corpus of data, noting similarities and differences among this small pool of research subjects;
- Identified major strengths, logistical issues and weaknesses of the study’s design; and
- Gained invaluable practical experience as researchers and analyzers of the resulting corpus of data.

Table 1. Differences between the professional life cycle groups.

|                          | <b>Student</b>  | <b>Professional</b>  |
|--------------------------|---|--|
| <b>Search Preference</b> | Strong preference for Basic Search, a default single search box                       | Greater diversity of search methods, utilizing Advanced, Browse, and Boolean search strategies at a markedly higher rate |
| <b>Search Process</b>    | Tended to start entirely new searches   | More likely to refine searches by changing part of the original query  |
| <b>Search Results</b>    | Searches received hits every time   | Experienced many searches yielding no results  |
| <b>Feedback</b>          | Mentioned the importance of locating Transportation Research Board (TRB) publications | Negative feedback about the URL of TRIS, viewing it as cumbersome and not understandable                                 |

### *Differences: Professional life cycle*

The researchers hypothesized that significant differences would exist between S1/S2 and P1/P2. The “S” group represented those at the start of their transportation career, while the “P” group was more advanced in the profession. Generational differences are intertwined as well, with the “S” group assumed to be (on average) younger than the “P” group (Table 1).

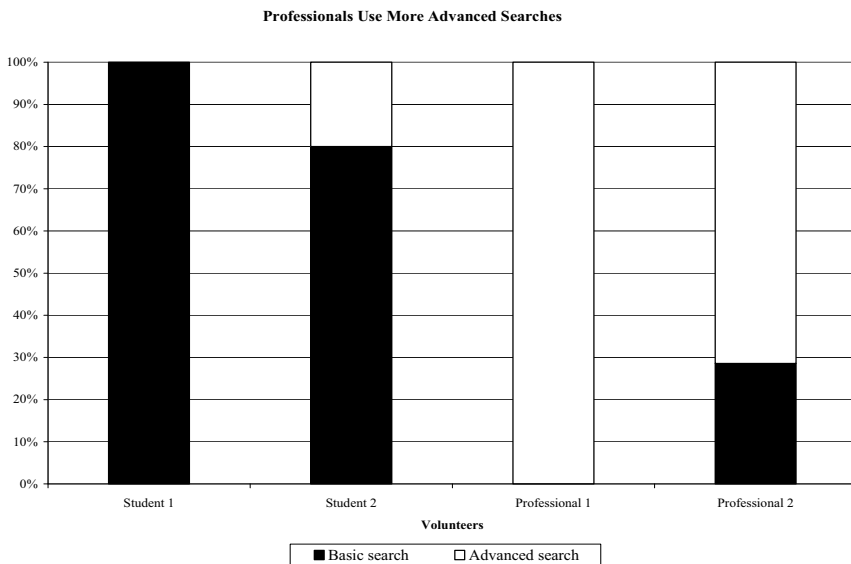


Figure 1: Use of advanced and basic search by volunteer.

### *Four different people, four vastly different searchers*

While the results support the researchers' assumptions that variation exists between those at the start of their professional life cycle and those more established in their careers, significant differences were observed among all four participants. Each of the four volunteers exhibited distinct searching styles and information seeking behaviors.

While no formal evidence or data was gathered about personality, the researchers noted that the volunteers' highly variable searching styles seemed connected to their separate personalities and communication styles. These observations are purely anecdotal and, as such, are colored by the perceptions of the researchers.

While creating searcher archetypes can be a useful sense-making tool, it is important to note that each category is really more a comparison of that volunteer to the other volunteers in the study. In other words, these archetypes serve as tools for comparison rather than being simply descriptive of each individual.

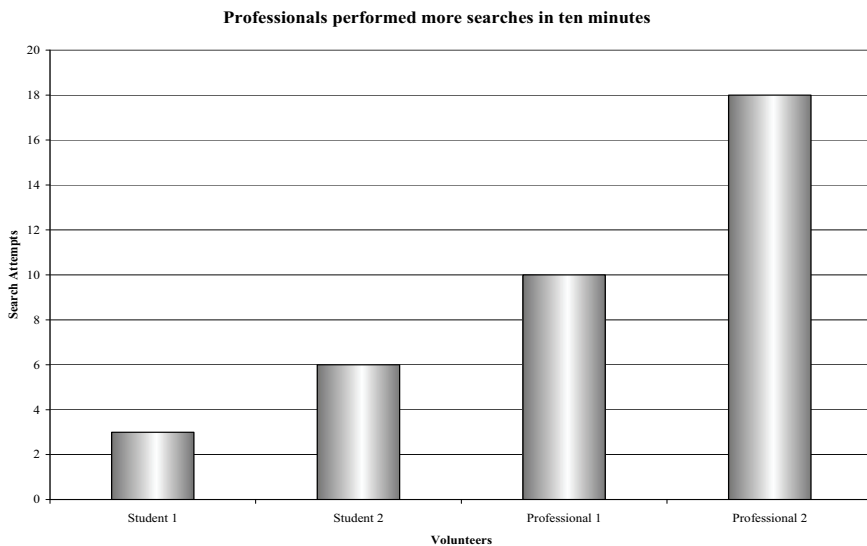


Figure 2: Number of searches performed per volunteer.

For example, if all four volunteers had used about the same pace in their searching behavior, the researchers would likely not have noted so strongly differences between S1 as “contemplative” and S2 as “speedy.” Comparing and contrasting forces certain traits to become more prominent in the eyes of the researchers, and diminishes the importance of other factors. This speaks to how dependent analysis and results are on the very pool of subjects studied. Were this project to expand into a large-scale study, the importance of a representative sample cannot be underestimated.

#### *Similarities across volunteers*

While differences were quite significant when comparing these four individuals, some similarities were noted. Common issues among all or most volunteers, included:

- All repeatedly mentioned Google. Comparing TRIS to Google was common, with Google overall mentioned as having superior searching technology, although not necessarily superior results or precision.
- All displayed an overwhelming preference for searching TRIS Online, or by TRIS Title when utilizing Browse. Both are the default search type within their respective drop-down lists.
- Volunteers performed zero searches of the NTL Catalog, NTL Digital Repository and Other Transportation Websites, and only one search utilizing the “All” option. The only mention of NTL was with puzzlement about what it was.
- No volunteers used the Transportation Research Thesaurus (TRT) hyperlinked terms within records, the TRT tab was never clicked, and no TRT searches were performed. Two of four volunteers—one in the P group and one in the S group—stated that they did not understand TRT’s purpose.

- Authors were mentioned as highly important by three out of four volunteers. For example, the author was cited as a main factor in pursuing a “hard to get” resource and a main starting point for finding resources online.
- Three volunteers specifically praised the “marked records” feature and used it.
- Overall, there was strikingly low use of internal access points found within TRIS records, such as hyperlinked titles, authors, and subject terms.

Table 2. Characteristics of searchers.

|   | Characteristics   |
|---|---|
| <b>Student 1:<br/>The contemplative searcher</b>            | Exhibited a searching style that was slow, methodical and deliberate. Taking much more time than the others in scrolling through search results, this volunteer became more absorbed in the process than others. During the interview portion, S1 was likewise extremely thoughtful in providing answers, doing so at a slower pace than any other volunteer.   |
| <b>Student 2:<br/>The speedy searcher</b>                   | Quick, determined and confident in both searching and communicating. S2 rapidly tested out various features within TRIS and tended to scroll through search results at a faster pace, compared to both S1 and P1. S2's interview was by far the shortest compared to all other volunteers, involving brief, to-the-point answers.   |
| <b>Professional 1:<br/>The expert searcher</b>              | The most experienced TRIS user utilized the most complex searching techniques compared to the other volunteers, such as Boolean searches incorporating the “NOT” command. While part of the “Professional” or “P” group, P1 defined self as a researcher and as connected to academia.  |
| <b>Professional 2:<br/>The “try and try again” searcher</b> | Experienced the largest number of failed searches of all the volunteers, but resolutely attempted searching. P2 also had many “speedy searcher” traits, never staying on one results screen for long before starting a new search. P2 defined self as someone who does not enjoy researching. P2 displayed a much greater interest in the research project itself, as well as the background of the researchers, than any other volunteers. P2 struck the researcher as a people person, a dealmaker and a networker. |

Possibly the most striking similarity was the overwhelming preference by all volunteers for keyword searching.

#### *Other similarities*

In addition to similarities that were noted across all or most volunteers, volunteers could also be paired for similarity in communication styles and feedback across the S and P groups.

This illustrates that while professional life cycle and generational differences were noted, other factors like personality and communication style may have been just as significant, if not more so, in driving the results. Both at home in academia, P1 and S1 had highly similar traits and expressed some common feedback. It is important to note that while P1 is a part of

the “Professionals” group, this individual works partly as a researcher in a university setting much like S1 who is a research assistant in a graduate program.

Both P1 and S1 remarked extensively about a need for greater access to full-text resources within TRIS. While this was a common and strong desire on both of their parts, differences existed. While P1 clearly wanted more full-text online, this professional also remarked that things were certainly better now than in the “old days” when one always had to go to the library, find the journal in the stacks, and then make copies to get an article. In today’s world where online access to resources is the expectation, P1 is now “highly unlikely” to travel to the library except for an extremely critical resource.

More attractive options for P1 included checking for electronic access through the university library website, free online journal access offered as part of professional association memberships, or checking with a professor with an extensive personal collection. P1 would try all three of these avenues before going to the library.

### Keyword Searches Dominate

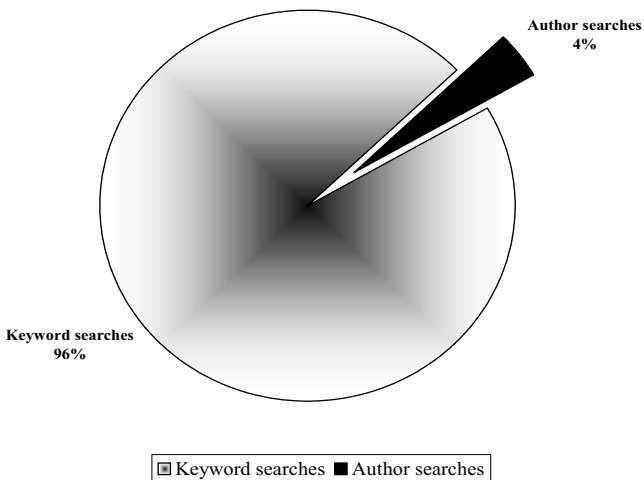


Figure 3. Keyword searches v. author searches.

S1 also stated that greater full-text online access would improve TRIS. However, S1 saw all alternatives in an electronic universe. When asked how S1 might pursue getting a resource that is not available online via TRIS, the library was mentioned as an option in terms of its online indexes that may carry that title with full-text. Google or GoogleScholar were additional options for locating the resource on the open web.

When asked how much additional time it would take to get it *physically*, S1 responded “about an hour,” restating the online options that could be used to find it. S1 never mentioned the

possibility of visiting the library, interlibrary loan or ordering the resource through means sometimes suggested within TRIS.

P2 and S2 mirrored one another even more strongly in their behaviors and comments. As noted earlier, both were “speedy searchers” moving rapidly through TRIS features and inputting new searches quickly. One researcher’s impression, immediately after meeting P2, was that this was someone exactly like S2, only 10 or 15 years older. Both were people-centered with outgoing personalities who the researchers could easily see as dealmakers within their profession.

P2 and S2 were highly interested in technical issues. Both asked many questions about how TRIS worked, specifically about the underlying technical mechanisms that drove the database. Both basically wondered audibly about algorithm(s) used, though neither used that term.

S2 was quick to comment that TRIS seemed to be sensitive to search terms, noticing different results when inputting two terms that essentially meant the same thing. One term provided far superior results, and S2 was uncertain about exactly why.

P2 wondered specifically what criteria TRIS used to generate results, speculating that the search terms had to be in the title (after mainly using the Browse feature by TRIS Title). Both volunteers also had questions about who produced TRIS and where the content originated.

P2 and S2 expressed frustration that TRIS did not interpret their search terms in a way that provided useful results. Both connected this frustration to their lack of understanding about how exactly TRIS worked. The researchers’ perception was that P2 and S2 felt that if they knew the internal workings of the database, they could become more effective searchers. P2, in particular, spoke at length about difficulties in finding search terms that would yield productive results, saying that the “mechanism [in TRIS] to connect with the word does not work. It’s like the database does not connect the word I put in with what I really want information about. That mechanism seems to work in Google. It obviously does not work the same way here.”

Each mentioned a lack of specificity within their search results that they found irritating. S2 felt that TRIS used “search parameters that were too tight” that did not allow one to combine more than one concept, specifically citing a desire to combine “congestion pricing” and “value pricing” in a single search. P2 repeatedly stated that TRIS did not allow one to “drill down” to a very refined subject and asked “If I get a group of hits, how do I pare it down to what I’m really looking for?” For example, while multiple resources were available for the larger topic of “bus rapid transit” or “BRT,” P2’s searching was not satisfactory after trying to narrow to items about BRT shoulder running. P2 and S2 clearly wanted TRIS to more automatically detect the nuances of their searches and produce results that matched their needs accordingly.

### **Strengths and weaknesses of the study design**

As discussed in the Pilot Study Design, and upheld in the results presented here, the mixed-methods approach presents a robust corpus of data. The researchers found that the design is feasible and yields data necessary for extensive analysis. The diversity of the results is a major factor pointing to the value of further investigation in this area. If the pilot study data tells any sort of story, it is that people use TRIS in vastly different ways. The researchers

recommend that all major elements of the Pilot Study Design remain intact should this project be reproduced on a larger scale.

Table 3. The researchers also noted individual, sometimes contradictory viewpoints.

| Comments   | Background  |
|--|---|
| “With Google, things are all over the map.”          | S1 stated that TRIS was much more precise and provided more relevant search results than Google. Specifically, S1 stated “TRIS is more focused than Google.”<br>Conversely, P2 stated that TRIS and Google had similar problems in that search results were never precise enough.   |
| “You know, like Amazon.”                             | Social features, such as commentary by other users or authors, were cited by P1 as an improvement TRIS could make. The ability to see “more like this” (Amazon.com), based on user comments and other users’ searches, would be highly desirable.   |
| “User Friendly”?                                     | To S2 TRIS was “user friendly” and “self intuitive.”<br>P2 described TRIS as “not user friendly” multiple times.  |
| “TRIS should remind you of its existence.”           | P1 believed that TRIS would be utilized more often if it:<br>1) advertised on Google after a transportation-related search,<br>2) imported citations directly into citation management software,<br>3) worked with the university library’s SFX technology, and<br>4) linked to other transportation resources/databases.<br>To S1, instruction by a librarian on transportation-specific resources and a link to TRIS from a transportation student group page would also be valuable. |
| “Most other students I know do not know about TRIS.” | While S1 would recommend TRIS to a peer, feedback indicated that most are unaware of this resource.   |
| “We all learn from each other.”                      | P2 repeatedly emphasized professionals’ need for best practices materials, which s/he saw as separate from the “research reports” offered by TRIS.  |
| “A tool to stay on the cutting edge.”                | P2 saw value in TRIS as something that could make a professional competitive.   |
| “I’d like to play around with it more.”              | S2 saw the possibility of future exploration.   |
| “Wide range of information.”?                        | While one of P1’s first comments was that TRIS contained a wealth of information, one of P2’s main criticisms was that it needed an “expanded data set” beyond pure research to contain materials that were practically-oriented and international in scope.  |
| “I really don’t care who the publisher is.”          | When viewing a record, all participants appeared to scroll down to read the abstract. P1 was the only one to address this in the interview, suggesting that the abstract be placed at the top of the record, below the title and author. Other information, like the publisher, does not have to be towards the top.  |

Table 4. Needed refinements.  
**Recommendation to Study Design**

|  |  |
|--|--|
| <b>Coding</b>                                  | <i>Recommendation:</i> Coding in the observation portion would be critical on a larger scale. For example, the researchers' observation notes use various names, such as "full view" and "full record."  |
| <b>Demographic</b>                             | Demographic data was not collected, in part to protect the confidentiality of the volunteers; any reporting could have effectively served as identifying information.<br><i>Recommendation:</i> In a larger study, demographic data would be valuable, especially including the specific type of transportation professional / discipline of each volunteer.   |
| <b>Interview questions</b><br>(see Appendix D) | Follow-up and clarifying questions were asked as necessary.<br><i>Recommendation:</i> Include the flexibility to ask follow-up questions. There was a tendency to frame follow-up questions based on what the researchers had heard in previous interviews (out of a conscious or subconscious desire to gather comparable data); more formal parameters about what type of questions should be incorporated. Questions should remain non-specific and open-ended. Each of the main questions delineated on Appendix D should be asked in different ways until the volunteer has nothing more to add.  |
| <b>Logs</b>                                    | <i>Recommendation:</i> In lieu of formal transaction logs, the "Search Results" and "Marked Records" screens were useful when analyzing observation results. Saving screenshots should be standard protocol.   |
| <b>Observation Tool</b><br>(see Appendix C)    | The chart was not useful during observations and instead was used after the observation to tally results. During observations, notes were made in a dual-column format, including navigation moves on one side and other notes such as body language on the other. These were typed into the charts found in Appendix C immediately after each observation/interview.<br><i>Recommendation:</i> A separate tracking form should be used to track both navigation and body language. Results can be translated into the observation tool, which should also include "Browse" and "URL/PDF accessed via TRIS record" (separate from "Resources accessed outside of TRIS"). |
| <b>Operational definitions</b>                 | There was a discrepancy in defining exactly what a "search" or "query" was for the purposes of quantitative data. For example, did accessing an internal hyperlink within a record—which can yield an entirely new list of search results—qualify as a "search"?<br><i>Recommendation:</i> Use the following definition: a search is any action that results in, or is intended to result in, records from the TRIS database, including Basic Search, Advanced Search, Browse, or hyperlinks internal to one record.   |
| <b>Space</b>                                   | Three of the interviews were conducted at Wilson Library, an academic library at the university where both "S's" go to school and one "P" works, and one in the volunteer's office. The researchers expected the library room to be more artificial and the office setting more authentic. Instead, the office setting felt intrusive and the volunteer seemed more conscious of the researcher's presence. The library allowed the researchers to be in a less obtrusive spot.  |



|  |   |
|--|---|
|  | <i>Recommendation:</i> A consistent choice should be made about space, with a strong preference for “researcher defined” space rather than the “natural habit” like a volunteer’s office.   |
| <b>Statistical analysis</b>            | The researchers used descriptive statistics in drawing a quantitative picture from their four sets of results.<br><i>Recommendation:</i> With a larger pool, more advanced quantitative analysis could be performed to outline correlation among the data. A record-keeping program or database would aid researchers better than the simple spreadsheet mechanism utilized here.   |
| <b>Time keeping</b>                    | <i>Recommendation:</i> Use a stop watch to ensure that the observation portion is exactly 10 minutes.   |
| <b>Video recording and researchers</b> | Both researchers were present at only one observation/interview.<br><i>Recommendation:</i> With IRB approval, use video-taped sessions to alleviate the problem of recording by hand all database navigation moves and interview notes. With this, one researcher could sufficiently perform the study. However, because of the synergy and data analysis strengths, the researchers would recommend this as a paired research project.   |
| <b>Time management</b>                 | While volunteer interactions were about 45 minutes each, as planned, set-up time plus data recording made each last between 3-4 hours each. This would pose problems with a larger pool.<br><i>Recommendation:</i> Streamline data collection through coding and focused follow-up questions within the interview. This works best as a two-person project; however, only one researcher is needed at each interview should video be utilized, alleviating some time constraints. |

While the above issues would need attention, they are mainly logistical problems that can be remedied. Conversely, this study’s major flaw is the limit that its very nature imposes on the volunteers being studied. In looking at information seeking behavior, it should be recognized that this study begins and ends with TRIS—the tool, the information resource—not with the user. In other words, the study in no way captures the totality of the subjects’ information seeking behavior. Nor does the study design fully account for assessment of the information needs of this population. Instead, the focus is on a specific, one-time interaction between a person and TRIS. The results are nevertheless highly valuable but should not be extended to try to describe how this population interacts with online databases more generally, for example.

#### *Further research impacts*

Based on findings from the pilot study, the researchers believe that results from a larger-scale study could effectively render an action research agenda aimed to:

- Inform the Center for Transportation Studies (CTS) about some information seeking behaviors of one of its crucial constituent groups.
- Aid the Transportation Research Board (TRB) and the National Transportation Library (NTL) in improving TRIS to even better meet the diverse needs of those involved in the transportation field, at all points in their professional life cycle.
- Identify effective methods for a diverse population of potential users to better find and stay connected to TRIS as a premier transportation-related information resource.

## **Pilot Study Design**

### *Methodology & Design*

As mentioned earlier, the project seeks to address the primary research question: “How is TRIS serving the unique needs of transportation professionals?” with an emphasis on differences that may arise between those at the start of their career and those more established in the field. The research question is suited to a mixed methods approach, combining quantitative and qualitative methodologies.

The pilot study was comprised of two main parts:

1. Volunteers were asked to research a topic of their choosing using the TRIS system for 10 minutes. The researchers observed their attempts at using TRIS and noted specific elements of the interaction between user and online database.
2. After the observation, the researchers interviewed the volunteers and noted their responses. The interview portion had no time limit.

The pilot study utilized a mixed methods approach. The quantitative element was present in the first segment of the study. Here, the researchers developed a tool to record the number of times the volunteer utilized particular features within TRIS. The tool was also used to record the number of mouse clicks and the start and end times of the observation. (see Appendix C). Quantitatively, the researchers gathered information that allowed for more ready and uniform comparison across the two groups being studied.

A qualitative tool was utilized in the second part of the interaction. The interview questionnaire guided the researchers in gathering verbal feedback about the experience the volunteer just had with TRIS, past experience using this resource, improvements the volunteer would make and other comments. The questions were designed to match the exploratory aim of this project. Most questions were open-ended to gather the broadest spectrum of information possible. Qualitatively, the researchers were able to gather data to help assess the nature of the volunteer’s experience and attitudes toward TRIS, and whether this was a valued and user-friendly resource in their world.

The exploratory nature of the interviews was particularly important to the researchers given the lack of previous TRIS usability research pointing toward a specific area of inquiry needing further investigation. Furthermore, the researchers aimed to allow the volunteers to feel as empowered as possible in fully describing their experience about using TRIS. The researchers posed follow-up questions where appropriate to clarify the volunteers’ responses (see Appendix D).

Most importantly, the combination of the two sets of data provides a much more holistic, broad perspective so essential for the success of this exploratory project.

The researchers strove to maintain as neutral as possible of a role toward the resource (TRIS), attempting to convey to volunteers that their interest was not an attempt to prove its benefits or weaknesses. The researchers wanted the volunteers to feel as comfortable as possible so that the interaction between the volunteers and the resource was as natural as possible. By allowing the volunteers to select their own topic(s), the researchers sought to decrease the chances of artificial search behavior. Authenticity, or observing the volunteers doing what they would “normally” do, was an important concern in all aspects of the research design. At the same time, the researchers realize that their mere presence would naturally influence the behavior of the volunteers. The setting (the volunteer’s own office or the Wilson Library on

the University of Minnesota campus) hopefully closely resembled a “real life” scenario for the volunteers.

The overall design of the pilot study involved several steps:

1. Completing an exhaustive literature review.
2. Obtaining a list of volunteers from the transportation community.
3. Securing space for volunteer observations/interviews.
4. Contacting volunteers and setting up meeting times.
5. Providing reminders to volunteers, along with a request to think of a transportation-related topic to find information about (See Appendix E).
6. Meeting with volunteers for observations and interviews.
7. Transcribing notes immediately after volunteer meetings.
8. Analyzing both qualitative and quantitative data.
9. Generating a final report, inclusive of pilot study data and conclusions.

### *Data Collection*

After the observations and interviews, the researchers accumulated a corpus of quantitative data which was expected to include:

- Length of time each volunteer spent utilizing TRIS
- Number mouse clicks made in each session
- Number and type of queries performed in each session
- Number of times various TRIS versus NTL collections were searched
- Access points used for each search query
- Number of times certain features within TRIS were used
- Number of times each volunteer accessed Internet resources outside of TRIS

The researchers used three research tools, the latter two having been briefly mentioned earlier.

1. **Introduction Notes:** written instructions given to volunteers to reiterate the researchers’ initial verbal instructions (see Appendix B).
2. **Observation Tool:** one-page list researchers use to note the number of times volunteers use certain TRIS features, as well as number of mouse clicks and start/stop time. Simple hash marks can be easily noted using this chart (see Appendix C).
3. **Interview Questionnaire:** follow-up questions researchers ask volunteers at the conclusion of the observation (see Appendix D).

### *Subjects*

Subjects for the pilot study were volunteers recruited from suggestions from the staff of CTS. The researchers approached two graduate students in urban planning and civil engineering and two urban planning professionals.

The pool of research subjects was not random. Only two students were specifically recommended by CTS staff, one being a graduate who was also employed through CTS and the other being a student leader known to CTS personnel. For choosing professionals, the researchers were supplied with a list of 48 transportation professionals, namely drawn from the Planning and Environment Council which acts in an advisory role to CTS. This list was refined through recommendations by Arlene Mathison, CTS Librarian, and Linda Preisen, Director of Research at CTS.

The goal of the pilot study was to provide the researchers (themselves graduate students and novices to this type of project) with an opportunity to sharpen their skills and test their

methods and research tools. The goal of the small pilot study was never to gain statistically valid results or conclusions that could be generalized to a larger population. Therefore, the researchers did not attempt to find a representative or random sample for their volunteer base. Instead, they chose to connect with volunteers associated with CTS because of ease of access. The researchers recognize that the small number of volunteers involved in the pilot study and their non-random nature may highly bias any results.

The researchers' justification for choosing the two graduate students and two professionals was to compare the information seeking behavior individuals starting out in the field of transportation to those with some practical experience.

### *Role of the Researcher*

The researchers saw many advantages to their respective backgrounds related to the transportation discipline. First, they were able to use familiar terminology with the volunteers, and the shared vocabulary helped avert communication problems that may have been present otherwise. The researchers' connection to CTS was helpful when originally soliciting their participation. The researchers felt that their connections to the field of transportation helped provide them with credibility in the eyes of the volunteers.

Two additional biases of the researchers are worthy of note. First, the researchers believed that TRIS Online is a valuable resource containing beneficial information for the transportation community, including the study's volunteers. Second, the researchers assumed that differences would arise between graduate students and established professionals, due to factors noted in the literature review. While both beliefs were confirmed in the researchers' literature review, they present attitudes that may influence how the researchers interacted with the volunteers or viewed the results of this pilot study. The researchers hope that awareness of these biases helped to prevent them from unduly influencing their results.

### *Conclusion*

The researchers, upon completion of all observations/interviews, analyzed this quantitative data to find trends occurring across all volunteers as well as any differences between seasoned transportation professionals and graduate students beginning their careers. With only four sets of data, the researchers used descriptive statistics to illustrate the volunteers' information seeking behavior while utilizing TRIS.

Qualitatively, even more data was accumulated by the completion of all observations and interviews. The researchers analyzed interview notes to draw overarching conclusions, finding that the diversity of information seeking behaviors among these four individuals to be just as striking as the differences between the two groups.

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**Appendix A: Data/Results** – Figure 4. Observation data

|                                       | <b>S1</b>     | <b>S2</b>     | <b>P1</b>     | <b>P2</b>     |
|---------------------------------------|---------------|---------------|---------------|---------------|
| <b>TIME</b>                           |               |               |               |               |
| Time Given                            | <b>10 min</b> | <b>10 min</b> | <b>13 min</b> | <b>10 min</b> |
| <b>SEARCHES</b>                       |               |               |               |               |
| Searches (Total)                      | 3             | 6             | 10            | 18            |
| Basic search                          | 3             | 4             | 0             | 2             |
| Basic search as % of total            | 100%          | 67%           | 0%            | 11%           |
| Advanced search                       | 0             | 1             | 10            | 5             |
| Advanced search as % of total         | 0%            | 17%           | 100%          | 28%           |
| Browse *                              | 0             | 1             | 0             | 11            |
| Browse as % of total                  | 0%            | 17%           | 0%            | 61%           |
| <b>COLLECTIONS</b>                    |               |               |               |               |
| TRIS Online searches (default)        | 3             | 5             | 10            | 6             |
| TRIS Online as % of total             | 100%          | 100%          | 100%          | 33%           |
| Number of NTL searches                | 0             | 0             | 0             | 0             |
| NTL as % of total                     | 0%            | 0%            | 0%            | 0%            |
| Number of All searches                | 0             | 0             | 0             | 1             |
| All as % of total                     | 0%            | 0%            | 0%            | 6%            |
|                                       | <b>S1</b>     | <b>S2</b>     | <b>P1</b>     | <b>P2</b>     |
| <b>ACCESS POINTS: Within searches</b> |               |               |               |               |
| Keyword searches                      | 3             | 4             | 10            | 7             |
| Keyword as % of total                 | 100%          | 67%           | 100%          | 39%           |
| Author searches                       | 0             | 1             | 0             | 0             |
| Author as % of total                  | 0%            | 17%           | 0%            | 0%            |
| Browse by NTL classification          | 0             | 1             | 0             | 0             |
| Browse NTL as % of total              | 0%            | 17%           | 0%            | 0%            |
| Browse search: TRIS Title (default)   | 0             | 0             | 0             | 11            |
| Browse TRIS Title as % of total       | 0%            | 0%            | 0%            | 61%           |
| <b>ACCESS POINTS: Within records</b>  |               |               |               |               |
| Author hyperlinks                     | 0             | 1             | 0             | 0             |
| Title hyperlinks                      | 0             | 0             | 1             | 0             |
| Other term hyperlinks                 | 0             | 0             | 0             | 0             |
| <b>OTHER FEATURES</b>                 |               |               |               |               |
| Number of marked records              | 4             | 1             | 4             | 0             |
| Number of times at Search History     | 0             | 1             | 0             | 0             |
| URL/PDF accessed via TRIS record      | 2             | 0             | 0             | 1             |
| Mouse clicks                          | 35            | 34            | 55            | 59            |
| <b>FEATURES NOT UTILIZED</b>          |               |               |               |               |
| TRT Tab                               | 0             | 0             | 0             | 0             |
| Help Tab                              | 0             | 0             | 0             | 0             |
| TRT hyperlinks                        | 0             | 0             | 0             | 0             |
| TRT searches                          | 0             | 0             | 0             | 0             |

## Appendix B: Introduction Notes for Volunteers

Thank you for agreeing to participate in a pilot study project for our Master's in Library and Information Science course. You are one of four volunteers who are participating in the pilot study project. Below are some brief instructions for you to reference, after the researchers provide you with a verbal introduction.

1. Please access the online database at: <http://ntlsearch.bts.gov/tris/index.do>.
2. Use this resource to find information on a transportation-related topic that interests you.
3. The researchers will conclude your session after 10 minutes. If you are finished before that time, please let the researchers know.
4. While the researchers would like to help you, please note that they are only to observe you during your research process. We will have a chance to talk about any questions you may have at the conclusion.

## Appendix C: Observation Tool for Pilot Study

|                             |  |
|-----------------------------|--|
| Start Time                  |  |
| End Time                    |  |
|                             |  |
| Mouse Clicks                |  |
|                             |  |
| <b>Number of Searches</b>   |  |
| Queries (Total)             |  |
| Basic Search                |  |
| Advanced Search             |  |
|                             |  |
| <b>Use of Collections</b>   |  |
| TRIS Online (default)       |  |
| NTL                         |  |
| All                         |  |
|                             |  |
| <b>Use of Access Points</b> |  |
| Keyword                     |  |
| Author                      |  |
| Title                       |  |

|  |  |
|--|--|
| Subject                                |  |
| TRT Terms                              |  |
|  |  |
| <b>Use of Other Tabs / Features</b>    |  |
| Search History                         |  |
| Marked Records                         |  |
| TRT                                    |  |
| Help                                   |  |
|  |  |
| <b>Resources Accessed Outside TRIS</b> |  |

#### Appendix D: Interview Questionnaire

1. Please describe the situation/experience you just had. \_\_\_\_\_

2. Have you used TRIS? \_\_\_\_\_

Yes - what are the values/benefits? \_\_\_\_\_

No - reactions - would you use it again? Would you recommend it to a peer \_\_\_\_\_

3. What could make TRIS better? \_\_\_\_\_

4. Can you tell us why? \_\_\_\_\_

5. Other comments? \_\_\_\_\_



## Appendix E: Sample Reminder Email to Volunteer

Dear [NAME],

As we discussed this morning, I am conducting a small-scale pilot study looking at how people use a transportation-related online database. As mentioned, I am affiliated with the Center for Transportation Studies (CTS) as a Library Intern and am a graduate student in Library & Information Science at the College of St. Catherine. This project is being conducted collaboratively with fellow student Sarah Kleppe.

Thank you for volunteering to meet with me next Thursday, April 12 at 9 am at Wilson Library. Map, parking and accessibility information for Wilson Library can be found at <http://www1.umn.edu/twincities/maps/OMWL/index.html>. Our meeting will take approximately 45 minutes.

Before you arrive, please take a moment to think of a transportation-related issue you would like finding information about (examples include: gas tax, congestion, transit, etc.).

I will plan to meet you on the first floor of Wilson. Walk straight ahead from the main entrance, toward the Information Commons (looks like a computer lab), and you will find me near the comfortable bucket chairs. I appreciate your making time to travel to campus; however, please note that ethical considerations prevent us from being able to validate or cover parking expenses.

If you have any questions, please do not hesitate to contact me via email or at 612-624-8592 (work) or 503-997-1808 (cell). Thank you again for volunteering your time.

Margaret Ostrander  
daytime: xxx-xxx-xxxx  
cell: xxx-xxx-xxxx